CLAIMS

We claim:

1. A method of detecting a target analyte in a sample comprising:
   a) providing an array comprising:
      i) an array substrate, wherein said array substrate is other than a fiber optic bundle; and
      ii) at least first and second sites wherein first and second reaction components are immobilized at said first and second sites, respectively;
   b) contacting said array substrate with said sample; and
   c) detecting a change in an optical property around at least said first site as an indication of the interaction between said target analyte and at least said first reaction component.

2. The method according to claim 1, wherein said target analyte is an enzyme.

3. The method according to claim 2 wherein at least one of said first and second reaction components is a substrate of said enzyme.

4. The method according to claim 3, wherein said first and second reaction components are attached with a non-cleavable linker to first and second microspheres, respectively, wherein said first and second microspheres are randomly distributed on said array substrate.

5. The method according to claim 1 wherein said target analyte is an enzyme substrate.

6. The method according to claim 5 wherein at least one of said first and second reaction components is an enzyme.

7. The method according to claim 1, wherein said target analyte is an enzyme inhibitor.

8. The method according to claim 7, wherein at least one of said first and second reaction components is an enzyme.

9. The method according to claim 1, 2, 5, 6, 7 or 8, wherein said first and second reaction components are attached to first and second microspheres, respectively, said first and second microspheres randomly distributed on said array substrate.

10. The method according to claim 1 wherein said first and second reaction components are enzymes.

47

11. The method according to claim 1, wherein said array substrate is selected from the group consisting of glass, composite materials, ceramics, metals and plastic.

12. The method according to claim 1 or 11, wherein said array is a spotted array.

13. A method of detecting a target analyte in a sample comprising:

    a) providing an array comprising:

        i) an array substrate comprising discrete sites; and

        ii) a population of microspheres comprising at least first and second subpopulations comprising:

            (a) first and second reaction components respectively; and

            (b) a detection molecule;

    b) contacting said array with said sample; and

    c) detecting a change in an optical property around at least said first microsphere as an indication of the interaction between said target analyte and at least said first reaction component.

14. The method according to claim 13, wherein said first and second reaction components and said detection molecule are enzymes.

15. The method according to claim 14, wherein an enzymatic product from said first reaction component is an enzyme substrate for said detection molecule.

16. The method according to claim 1 or 13, wherein said contacting is in the presence of a diffusion retardant.

17. The method according to claim 16, wherein said diffusion retardant is glycerol.

18. A method of detecting an enzymatic reaction comprising:

    a) providing an array comprising

        i) an array substrate comprising discrete sites; and

        ii) a population of microspheres randomly distributed on said array substrate, said microspheres comprising at least one enzyme;

    b) contacting said array with a sample comprising a target analyte, wherein said target analyte is an enzyme substrate;

    c) monitoring a signal in a region surrounding said microspheres, whereby detection of said signal provides an indication of the reaction between said enzyme and said enzyme substrate.

19. A method of detecting an enzymatic reaction comprising:

    a) providing an array comprising:

        i) an array substrate comprising discrete sites; and

        ii) a population of microspheres randomly distributed on said array substrate, said population comprising first and second subpopulations, wherein said first and second subpopulations comprise first and second discrete oligonucleotides, respectively, attached to said microspheres;

    b) contacting said array with a composition comprising an enzyme;

    c) monitoring a signal in a region surrounding the microspheres, whereby detection of said signal provides an indication of the reaction between said enzyme and at least one of said discrete oligonucleotides.

20. A method according to claim 18 or claim 19 further comprising:

    d) including in said sample a solution to prevent the diffusion of said label away from said microsphere.

21. A method according to claim 20, wherein said solution comprises glycerol.

22. A method according to claim 18 or claim 19, wherein the product of said reaction comprises said label.

23. A method according to claim 13, 18 or 19, wherein said array substrate is a fiber optic bundle.

24. A method according to claim 13, 18 or 19, wherein said array substrate is selected from the group consisting of glass, composite materials, ceramics, metals and plastic.

25. A method according to claim 24, wherein said discrete sites are well.